[Reprinted from THE PHILADELPHIA MEDICAL JOURNAL, April 1, 1899.]

LIBERTY IN MEDICAL EDUCATION.

BY FRANKLIN P. MALL, M.D.,

Professor of Anatomy, Johns Hopkins University, Baltimore.

A QUARTER of a century ago the medical schools of this country gave an annual course of lectures which was attended by all students and was repeated each year. For this privilege students paid a single fee, for which they heard much, saw little, and did nothing. There were no requirements for admission and very few for graduation. At the end of the session the trustee-members of the faculty divided the profits among themselves. Since that time, however, great strides have been made in the direction of improvement, stimulated mainly by other educational movements in the country. The quality of the professor has been improved, a graded course of instruction has been introduced, and requirements for admission have been established. These improvements have been encouraged to the greatest extent by the educated people on the one hand and by the medical profession on the other, through the introduction of State laws regulating the practice of medicine. Schools of medicine have thus grown from one course of lectures, extending over 5 months, to 4 graded courses of 9 months each. The requirements for admission have been increased from *nil* to a liberal education as expressed by a college degree. The quality of the professor has also kept pace with the increased requirements of the medical school.

There are at present in the United States 48 medical colleges having courses extending over 3 years, and 70 colleges having courses extending over 4 years. Of the latter group, 14 have sessions of 8 months each and 8

have sessions of 9 months.[1] This group of 8 schools has in general increased the requirements for admission to a high-school education, while one of them requires a college education with a college degree. Two of them have announced that in the near future the requirements for admission shall be increased beyond the present standard. On account of the lead thus taken by these institutions, as well as for their general good standing, I shall term them medical schools of the first order.

In order to raise the standard of the medical schools of 25 years ago to that of the schools of the first order as they exist at present, it has been necessary to pass through the stages of graded courses, for in so doing not only could the value of graded and progressive courses be demonstrated to all who took them, but at the same time unworthy students could be eliminated. Experience teaches that the student who has been well trained in the fundamental departments of medicine demands a more careful training in those which follow; accordingly it follows that if we wish to attain to higher standards in the practical branches the teachers in the fundamental departments especially must be first improved. An effort in this direction is what we are witnessing at present all over the country. The institutions are demanding better courses in anatomy, physiology, and pathology, while the students, *propter hoc*, are demanding better medicine and surgery. If I have calculated correctly the forces at work the outcome of the movement will be that in less than another quarter of a century the standard of the schools which remain will be as high as that of the schools of the first order is at present. Such a result, of course, absolutely depends upon the schools of the first order retaining the lead, and on their gaining in addition stronger support from improved State examinations.

[1] Report of the Commission of Education, 1896–'97, vol. 2, p. 1792.

The immediate effect of the introduction of the graded course of 3 years, in 1880, was a marked falling off of the total number of medical students, and this decrease continued until 1887.[2] Since then the number of students has gradually increased until at the present time there are more than twice as many students as there were 10 years ago. Graduates of recent years know only too well the difficulties in gaining a livelihood, and our present students, with greatly increased opposition from State laws, the multiplication of dispensaries, and the distribution of trained nurses, have also a very poor outlook. The improvement in the quality of the student and of his education will not necessarily guarantee a practice when there are already too many physicians.

The schools of the first order have before them a responsibility far greater than increasing the number of students and of graduates. In order to keep in the lead they must at once improve the quality of their teaching-force and also give better facilities to selected students. At the University of Michigan and at the Johns Hopkins University the authorities are in no way hampered in the selection of their professors, and nearly all the latter are chosen from distant universities. The other medical schools of the first order are rapidly adopting the same method. This is a most hopeful sign, for nothing is more detrimental to educational institutions than the "inbreeding" of professors. To increase the length of the medical course beyond 4 years does not seem to me to be advisable. The requirements for admission to the Johns Hopkins Medical School are sufficiently high,[3] and the other

[2] Report of the Commission of Education, 1896–'97, Vol. 2, p. 1190.

[3] A degree in arts or science from an approved college, at least a year's laboratory training in physics, chemistry, and biology, and a reading knowledge of French and German. After June, 1901, candidates for admission to Harvard Medical School must present a degree in arts, literature, philosophy, science or medicine, etc.—Announcement of the Medical School of Harvard University, 1898–'99, p. 12.

schools of the first order promise to approach this requirement.

In the old medical course of one session, the student at best gained some idea of medical lore, and, in case he was deficient in this, he took the course again, thus making a two years' course of it. When the three-year graded course was introduced the second year was the first year taken over again, with a special third-year course added. In this way the student heard each course of lectures twice in order to make him remember it. But from examination it was found that the student remembered but little of what he had heard, and a new force was introduced to aid him in the memorizing process. Young instructors or individuals not usually connected with the institution extracted the essence of the course of lectures and drilled this into the classes. Thus arose the quiz-methodof instruction, so common in many medical schools. This helped the student to remember a sufficient amount to pass the examination, and all appeared satisfactory, for no one asked whether or not the student had actually gained knowledge and skill enough to practise medicine and surgery. Even to-day it is the recitation upon the lectures, laboratory work, or an assigned subject from a textbook that is employed as a test of a man's capacity. In all cases it is "learn the lesson we have set for you, recite well, then pass the examination, and after you have satisfied each instructor in this way, you are a Doctor of Medicine." In my opinion no method of training could be worse for a good student, while it puts a premium upon the mediocre candidate.

If we ask the question—how may we make it possible that the individual may assert himself, and how can we give the student a chance to test the use of the knowledge he may possess?—we need not seek far for the reply. We have only to inquire into the methods in vogue in the leading medical schools of Europe, which

are in many respects identical with those of the graduate schools of our own universities. European medical schools and American graduate schools afford facilities for many kinds of work to those who may profit by them. When the student has pursued enough courses (no two students necessarily having followed exactly the same course) to enable him to apply for a degree, he is examined, and in case he passes, the degree is granted him. Adapting this more liberal method to our own medical schools a plan may be formulated as follows:

1. Entrance examination.
   Followed by at least two years' study of the fundamental branches.
2. Intermediate examination.
   Followed by at least two years' study of the practical branches.
3. Final examination.
   The subject of examinations will be referred to further on in the course of my remarks.

Throughout the course thus outlined, the greatest latitude possible should be offered the student in the arrangement of his studies selected from (1) a required list, as well as from (2) an extensive group of electives, as recently advocated by Bowditch.[4]

We all know that students are very unequal in ability, as well as in capacity for work, and why should they all pursue the same course of study? It is certainly very injurious for students to take again courses

[4] Bowditch, *Boston Medical and Surgical Journal*, December 29, 1898. At present there is an elective system at Harvard and at the University of Pennsylvania, representing about 2% of the entire medical course. President Harper has just introduced an elective system into Rush Medical College, representing 17% of the entire course. There are elective courses at the University of Michigan, Columbia, and Johns Hopkins, but they do not give credit to the student further than the increased knowledge he may gain in taking them Students already overworked are not likely to take electives without prolonging their course of study, and there is so much disgrace accompanying the prolongation of the medical course under the present arrangements that this alone debars students from wilfully doing it.

with which they are familiar, feeling at the time that they do not grow from day to day. Furthermore, it is not beneficial to the true student to study with a whip over him, and we know only too well that this weapon is more often used by a poor instructor upon a good student than by a good instructor upon a poor student. If we had a liberal elective system the student would know why he takes a course, and under this condition would profit much more by it. To profit most the student must gain a perspective of his medical course. In my association with German medical students I have witnessed frequently the value of this point, emphasized centuries ago by Quintilian. While battling to establish themselves in an elective course of study a certain number fail and quietly withdraw from medicine; the average students continue along the trodden path, while the strong students become much more powerful.

Do we, with our obligatory methods, accomplish as much? I think not. We cast out the weak and disgrace them, the mediocre continue along the trodden path, but the strong are retarded. We do wrong when we disgrace the weak and it is our duty to develop the strong. It is poor logic and begging the question to assert that the German student develops better under the banner of liberty than the American would. It is not difficult to obtain overwhelming authority in favor of liberty in higher education; it is only degrading to our profession in America to assert that our students are not worthy of it. As long as this continues, medical education in America, in spite of the advance it has made during the last 25 years, will remain at its present low level in the eyes of the educators of the world.

"Only a few years ago, all students who graduated at Harvard College passed through one uniform curriculum. Every man studied the same subjects in the same proportions, without regard to his natural bent or

preference. The individual student had no choice of either subjects or teachers. This system is still the prevailing system among American colleges, and finds vigorous defenders. It has the merit of simplicity. So had the school methods of our grandfathers—one primer, one catechism, one rod for all children. On the whole, a single common course of studies, tolerably well selected to meet the average needs, seems to most Americans a very proper and natural thing, even for grown men."[5]

What is written above has in it the spirit of iconoclasm, and it remains to be shown, and I think it can be shown, that it is possible, in fact necessary, to bring about a change in the curriculum, even in the schools of the first order, to relieve their congested, illogical, and often absurd medical programs.

The following table has been compiled from the an nouncements of 6 of the leading medical schools and I give it with considerable reservation. Any one trying to confirm it will appreciate the difficulty in determining what these schools really give.

TABLE SHOWING THE NUMBER OF HOURS' WORK GIVEN IN THE VARIOUS DEPARTMENTS OF 6 OF THE LEADING MEDICAL SCHOOLS.

	A	B	C	D	E	F
Anatomy and histology	500	500	950	890	695	825
Physiology	250	210	300	150	120	160
Physiologic chemistry and pharmacology	275	105	300	250	465	530
Bacteriology and pathology	300	185	200	570	330	560
Other subjects	150	60	240		255	595
Medicine	625	420	460	515	480	320
Surgery	470	390	385	570	670	660
Gynecology	60	180	160	235	260	380
Obstetrics	200	180	220	280		
Dermatology	30	120	40	100	100	95
Pediatrics	15	90	40	80	90	
Nervous diseases	30	100		120		325
Genito-urinary diseases	15	30	65	120	110	480
Laryngology	15	120	40	100	120	
Ophthalmology	100	300	40	100	105	
Other subjects	90	330	75	30	90	90
Total	3125	3320	3515	3910	3970	5220

[5] Eliot, Inaugural Address as President of Harvard College, October, 1869.

In glancing over the lines it is seen that the time devoted to any of the important subjects varies fully 100% in different schools. In some of the specialties it varies nearly 1000%. These facts in themselves are overwhelming evidence in favor of elective courses. If the correct quantity and order of the subjects are known, as is so frequently asserted, why this great fluctuation in hours? If a student of his own accord takes 325 hours of nervous diseases at school F, that is his own affair; but why should all students take 325 hours? At school A, on the other hand, if he desires to take but 30 hours, it is again his own affair, but why should all of them take so little? A similar argument can be applied to every course. Were the elective system in vogue a student might arrange the studies of school A like those of any of the other schools given in the table, or he might have any intermediate gradation. But how can this be done? We know that in all of the leading schools the year is divided either into 2 semesters, or into 3 terms. Let us consider only the institutions with 2 semesters, and what applies to them may apply equally well to the others. Several fundamental principles will have to be introduced.

1. The work in each department must be graded.
2. No course may extend over one semester.
3. The courses must be concentrated. Every course should be given at least 3 hours a week. Individual course-records must be kept, as is the case in all colleges.

For the sake of brevity I will designate a course of 3 hours a week for one semester a unit, for half that time a half unit; three half-days' laboratory course for one semester as two units, for half that time as one unit. Within this time all necessary medical courses can be given. The main clinical courses may be longer, but may be cut into blocks of a semester each, and this makes it easy to bring them into the scheme.

The courses in a department being graded, they will have to be arranged in such a manner that students knowing nothing about the work of the department may be given introductory courses in it during each semester. After the introductory courses have been taken they may take then the more advanced work of the department. The outcome of it all will be that each student will work at a speed to suit himself, conforming only to the rules and regulations of the department, and being controlled in addition by the examination system of the university as given above. He may not enter the school as a candidate for the degree of M.D. without having passed the entrance examination. He may not take any of the practical branches without having passed without condition the intermediate examination, the time between the entrance examination and the intermediate examination to be fixed at a minimum of 4 semesters or their equivalent. In case he is conditioned in any course he may be examined one semester later. The same rules may apply to the time between the intermediate and the final examinations.

I have used above the semester or its equivalent. It is noticed in the hours given in the table that the whole medical course at medical school A is 3,000 hours; at F, 5,000 hours. A total of 3,000 hours, or 750 per year is full work in the undergraduate science course of our leading colleges, and may be considered the standard for a medical course. With 3 hours a week for one semester as one unit, and 3 half-days' laboratory work one semester as two units, a student taking 6 units per semester would be doing full work as rated by college standards. Twelve units would represent a year's work, and 24 units two years' work, or the minimum requirements for persons presenting themselves for the intermediate examination. In a more detailed form the

work of the best schools can be recast with the above-described unit as basis in some such manner as the following:

TABLE SHOWING THE MEDICAL CURRICULUM RECAST WITH THE UNIT AS BASIS AND OBLIGATORY AND ELECTIVE COURSES.

ENTRANCE EXAMINATION.

	Obligatory.	Elective.
Anatomy	6 units	15
Physiology	2 "	4
Physiologic Chemistry and Pharmacology	3 "	6
Pathology and Bacteriology	4 "	10
Hygiene and Bacteriology		10
lective	9 or more	
	24 = two years' work	

INTERMEDIATE EXAMINATION (ANATOMY, PHYSIOLOGY, PHARMACOLOGY AND PATHOLOGY).

	Obligatory.	Elective.
Medicine	6 units	15
Surgery	5 "	15
Obstetrics	3 "	5
Gynecology		5
Dermatology		4
Pediatrics		4
Nervous Diseases		5
Genito-Urinary Diseases		4
Laryngology		4
Ophthalmology		5
Medical Jurisprudence		2
Psychiatry		4
Elective	10 or more	
	24 = two years' work.	

FINAL EXAMINATION (MEDICINE, SURGERY, OBSTETRICS, AND ONE ELECTIVE).

In the above table I have arranged the units in two columns, reducing the obligatory courses to their minimum without excluding any of the seven branches. Further cutting-down might be an improvement, but I will not raise that question at present. As it stands in

the table 60% of the entire 4 years is obligatory and the remaining 40% of the work is to be selected from a large group of elective courses. As they stand in the second column it would require an average student 8 or 10 years to take them all, and the two columns together represent work which our best schools can easily give at the present time. Much of our whole trouble in teaching is that we are trying to put 10 years' work into 4.

In case a school measured the time of a student by the number of units he had taken, it might be well to credit him only with 6 units per semester in order to discourage overwork. It would be his privilege to do as much additional work as he chooses, but in case he did less than 6 units per semester he would be credited for the amount he had really taken. The course-records might be controlled by practical tests at the end of a laboratory course or by a brief written examination at the end of a lecture course, it being distinctly understood, however, that these examinations are only to give credit for the course. It might happen that weak students, and often strong students, would take more than 24 units before applying for the intermediate examination.

The order in taking the work of the first half of the medical course should not be controlled any more than the rules of any department control them. It might be well for the course in pathologic histology to be preceded by histology and microscopic anatomy, but more than this is hardly necessary. If a student desired to take the pathologic histology without having had normal histology and the instructor did not object, the student would have to take the consequences. I, myself, did this as a student in Heidelberg and to this day have not regretted it.

After the intermediate examination the student would take the necessary courses preparatory to actual medical

and surgical work, and for this purpose there is always an abundance of instructors on hand. The group question would soon disappear, for a student might take sufficient elective courses to save time in reaching his goal, *i. e.*, doing practical work. Each student might try a different combination while working out his own salvation and developing his individuality. The weak student would either drop out or go slower, the average would follow the trodden path, the good one would develop himself. A congested course would soon be duplicated, the arrangement of the program would be extremely simple, and courses of no value would soon die a natural death. Demand and supply would become the important questions of each institution and the "trust" method of supporting either a poor student or a poor instructor would soon disappear.

The great complaint of the good student is coercion. Reared in a free atmosphere, accustomed to great liberty during his college years, he enters the medical school with intellectual slavery staring him in the face. The faculty trust is so powerful that if the student asserts his citizenship and remains away from a stupid course or one useless to himself he may be deprived of his degree. Long after he graduates he awakens to see that it is all a sham, and this fact adds another disgrace to our medical schools. Let us boldly define the work which is absolutely necessary for each student to do, give an abundance of electives from which he must select a certain quantity and then have a rational system of examination.

The bugbear of examination is so great that in my opinion it would be well to separate it from the course of instruction entirely. Many examinations are such an utter farce, so bad and so detrimental, that both physicians and many faculties have lost faith in them entirely. No greater argument need be given than the

fact that the physicians of many States will not permit the members of a teaching faculty to serve on the State examining board, while in some of the medical schools it is required that the student write his examination over a secret number in order that the reader of the paper does not know who has written it. Think of it! Then to bring this evil force into the lecture hall and the laboratory! But some compromise is here necessary, for how shall we determine whether or not the student has really taken the course? In Germany simple payment of a fee for a course and a perfunctory signature of the instructor gives the student credit for the course. In Austria the instructor must sign the student's book, to which is attached his photograph with a seal through it at the beginning and again at the end of the course. If we had some method a little more rigid than that in Austria it would suffice, for I think that we should "do away with examinations as much as possible. They produce mediocrity."[6]

The intermediate and final examinations should be true examinations to test a student's knowledge. At least 2 weeks should be given over to the examination in anatomy, during which time the student should be asked to make dissections, histologic preparations and the like. The examinations should not be primarily directed towards finding out what the student *knows;* rather toward learning what he can *do* with the knowledge he possesses. They should always be public in order to protect both the student and the examiner. The great length of time given over to the examination would remove most of the embarrassment of the student, which accompanies the briefer and crushing Ph.D. examination. In addition to the examination the credentials of the student should always be taken into consideration, for it is through them that we learn

[6] Paulson: Rein's Encyklop. Handbuch d. Pädagogik.

what the student has actually done, as well as much concerning the general character of the man. With a liberal system of electives no two sets of credentials would be the same.

The value of liberty in education has been pointed out again and again from the student's standpoint[7] but the benefit it renders an institution should not be forgotten. Liberty to the student should not mean license to him, but rather liberty also to the instructor. This question stirs our medical schools to their very foundation. At present our medical institutions are properly called schools and none of them can claim true relationship to the university. A medical department of a university must consist of a group of independent departments, each a complete organization in itself, existing primarily as a conservator of the branch it represents. Teaching beginners may become its main work, but should never be its chief ideal. These departments must be related to the university as a whole, as is the department of chemistry or of history, the former being bound together, however, through the medical faculty as the latter are through the philosophic. At present this ideal is reached by a very few departments scattered throughout the country. The rest are better likened to the departments of chemistry and history of ordinary colleges rather than universities, for they have ideals of teaching in common with the former. Their organization, their desire to teach and to examine, and the graded course of instruction, make the better medical schools similar to the average colleges. Some of the colleges are more liberal and more nearly related to the university than are the best medical schools.

It must never be forgotten that departments are unable to grow and perform their duty best when their

[7] See, for instance, Helmholtz, Akademische Freiheit, Berlin, 1878.

ideals are no higher than those of compulsory education. In their halls must live in the fullest degree the various sciences represented by them. There the science must also grow, and this is possible only with the banner of liberty over them. This is also most becoming in this country. We must always remember that it is with this banner over the German university that the greatest progress has been made; that embryology was there born simultaneously in the departments of anatomy, physiology, and zoology; that histology appeared at the same time in the departments of anatomy, physiology, and pathology, and that the greatest victory of modern medicine, bacteriology, is also to be credited to three departments—pathology, hygiene, and botany.

We are now on the verge of a new development in medical progress and education in which the strongest support is demanded from all sides. We need capable men to lead, liberty in medical education to strengthen them and to develop their disciples and their successors; endowments sufficiently large to raise the professors above the level of schoolmasters and to make the departments they represent, in reality departments of a university.